WHAT IS CLAIMED IS

1.   An image reading apparatus for reading an image of original, said apparatus comprising:

photoelectric conversion means for converting light

5   from the original into an image signal;

first correction means for correcting a white level of the image signal;

storage means for storing white reference data for white level correction in correspondence with a

10   reference temperature;

detection means for detecting a temperature near said photoelectric conversion means; and

second correction means for correcting the reference white data on the basis of a temperature

15   difference between the temperature detected by said detection means and the reference temperature,

wherein the white level is corrected by said first correction means using the white reference data corrected by said second correction means.

20   2.   The apparatus according to claim 1, further comprising a light source for illuminating the original.

3.   The apparatus according to claim 2, wherein said light source comprises a plurality of light sources having different colors.

25   4.   The apparatus according to claim 2, wherein said light source is an LED.

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5.   The apparatus according to claim 3, further
comprising control means for turning on said plurality
of light sources in a predetermined order.

6.   The apparatus according to claim 3, wherein a
plurality of white reference data respectively
corresponding to said plurality of light sources having
the different colors are stored in said storage means.

7.   The apparatus according to claim 1, wherein said
photoelectric conversion means is a CCD line sensor.

8.   The apparatus according to claim 2, wherein said
light source, said photoelectric conversion means, and
said first correction means are included in an image
reading device detachable from said apparatus.

9.   The apparatus according to claim 8, wherein said
image reading device comprises sending means for sending
the image signal to said apparatus.

10.   The apparatus according to claim 8, wherein said
image reading device comprises analog to digital
conversion means for converting a signal read by said
photoelectric conversion means into a digital signal.

11.   The apparatus according to claim 8, wherein said
image reading device comprises optical means for guiding
light emitted from said light source to the original and
guiding light reflected by the original to said
photoelectric conversion means.

12.   The apparatus according to claim 8, further

comprising a carriage on which a print head unit for forming an image on a printing medium is detachably mounted,

wherein said image reading device is detachably
5   mounted on said carriage.

13.   The apparatus according to claim 12, wherein said image reading device comprises sending means for sending the image signal to said apparatus through an interface for said print head unit.
10   14.   An image reading device detachably attached to an image processing apparatus having storage means for storing white reference data for white level correction in correspondence with a reference temperature, detection means for detecting a temperature near said
15   photoelectric conversion means, and first correction means for correcting the white reference data on the basis of a temperature difference between the temperature detected by said detection means and the reference temperature, said device comprising:
20   photoelectric conversion means for converting light from the original into an image signal; and

second correction means for correcting a white level of the image signal,

wherein the white level is corrected by said second
25   correction means using the white reference data corrected by said first correction means.

15.   The device according to claim 14, further comprising a light source for illuminating the original.

16.   The device according to claim 15, wherein said light source comprises a plurality of light sources having different colors.

17.   The device according to claim 15, wherein said light source is an LED.

18.   The device according to claim 14, further comprising control means for turning on said plurality of light sources in a predetermined order.

19.   The device according to claim 14, further comprising analog to digital conversion means for converting a signal read by said photoelectric conversion means into a digital signal.

20.   The device according to claim 14, further comprising optical means for guiding light emitted from said light source to the original and guiding light reflected by the original to said photoelectric conversion means.

21.   The device according to claim 14, wherein said apparatus comprises a carriage on which a print head unit for forming an image on a printing medium is detachably mounted, and said image reading device is detachably mounted on said carriage.

22.   The device according to claim 21, further comprising sending means for sending the image signal to

said apparatus through an interface for said print head unit.

23. An image reading apparatus for reading an image of original, said apparatus comprising:

5   photoelectric conversion means for converting light from the original into an image signal;

amplification means for amplifying the image signal;

detection means for detecting a peak level of an

10   image signal corresponding to a pixel within an effective pixel range of said photoelectric conversion means and a peak level of an image signal corresponding to a pixel outside the effective pixel range on the basis of an image signal for a white reference obtained

15   from said photoelectric conversion means; and

setting means for comparing the peak levels detected by said detection means and setting an amplification factor of said amplification means on the basis of the comparison result.

20   24. The apparatus according to claim 23, further comprising a light source for illuminating the original.

25. The apparatus according to claim 24, wherein said light source comprises a plurality of light sources having different colors.

25   26. The apparatus according to claim 24, wherein said light source is an LED.

27.   The apparatus according to claim 25, further comprising control means for turning on said plurality of light sources in a predetermined order.

28.   The apparatus according to claim 25, wherein said detection means detects the peak level for each color of said plurality of light sources.

29.   The apparatus according to claim 23, wherein said photoelectric conversion means is a CCD line sensor.

30.   The apparatus according to claim 23, wherein said light source, said photoelectric conversion means, and said first correction means are included in an image reading device detachable from said apparatus.

31.   The apparatus according to claim 30, wherein said image reading device comprises sending means for sending the image signal to said apparatus.

32.   The apparatus according to claim 30, wherein said image reading device comprises analog to digital conversion means for converting a signal read by said photoelectric conversion means into a digital signal.

33.   The apparatus according to claim 30, wherein said image reading device comprises optical means for guiding light emitted from said light source to the original and guiding light reflected by the original to said photoelectric conversion means.

34.   The apparatus according to claim 30, further comprising a carriage on which a print head unit for

forming an image on a printing medium is detachably mounted,

wherein said image reading device is detachably mounted on said carriage.

5   35.   The apparatus according to claim 34 wherein said image reading device comprises sending means for sending the image signal to said apparatus through an interface for said print head unit.

36.   An image reading method for reading an image of

10   original, said method comprising the steps of:

converting light from the original into an image signal using photoelectric conversion means;

correcting a white level of the image signal;

detecting a temperature near said photoelectric

15   conversion means; and

correcting white reference data for white level correction stored in correspondence with a reference temperature, on the basis of a temperature difference between a detected temperature and the reference

20   temperature,

wherein the step of correcting the white level is performed using the corrected white reference data.

37.   A computer program product comprising a computer readable medium having computer code, for reading an

25   image of original by using an image reading device having photoelectric conversion means for converting

light from the original into an image signal and correction means for correcting a white level of the image signal, said product comprising:

detecting process procedure codes for detecting a

5   temperature near said photoelectric conversion means;

correcting process procedure codes for correcting white reference data for white level correction stored in correspondence with a reference temperature, on the basis of a temperature difference between the detected

10   temperature and the reference temperature; and

controlling process procedure codes for controlling correction process of said correcting means so as to use the corrected white reference data.

38.   An image reading method for reading an image of

15   original by using an image reading device having photoelectric conversion means for converting light from the original into an image signal and amplification means for amplifying the image signal, said method comprising the steps of:

20   detecting a peak level of an image signal corresponding to a pixel within an effective pixel range of said photoelectric conversion means and a peak level of an image signal corresponding to a pixel outside the effective pixel range on the basis of an image signal

25   for a white reference obtained from said image reading device;

comparing the detected peak levels; and

setting an amplification factor of said amplification means on the basis of the comparison result.

5   39.   A computer program product comprising a computer readable medium having computer code, for reading an image of original by using an image reading device having photoelectric conversion means for converting light from the original into an image signal and

10   correction means for correcting a white level of the image signal, said product comprising:

detecting process procedure codes for detecting a peak level of an image signal corresponding to a pixel within an effective pixel range of said photoelectric

15   conversion means and a peak level of an image signal corresponding to a pixel outside the effective pixel range on the basis of an image signal for a white reference obtained from said image reading device;

comparing process procedure codes for comparing the

20   detected peak levels; and

setting process procedure codes for setting an amplification factor of said amplification means on the basis of the comparison result.

40.   An image processing apparatus having a carriage on

25   which an image reading device for reading an image of original is detachably mounted, said apparatus

comprising:

obtaining means for obtaining identification information representing an image reading device mounted on said carriage;

5   storage means for storing white reference data representing a white reference from said image reading device in association with identification information of the image reading device; and

setting means for reading out the white reference

10   data from said storage means corresponding to the identification information obtained by said detection means and setting the readout white reference data in said image reading device mounted on said carriage.

41.   The apparatus according to claim 40, wherein said

15   carriage on which a print head unit for forming an image on a printing medium is detachabley mounted.

42.   The apparatus according to claim 40, wherein the identification information is input by a user.

43.   The apparatus according to claim 40, wherein the

20   identification information is stored in said image reading device.

44.   The apparatus according to claim 40, further comprising detection means for detecting an ambient temperature near said carriage,

25   wherein said storage means further stores the ambient temperature in obtaining the white reference

data.

45.　An image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said apparatus
5　comprising:

detection means for detecting an ambient temperature near said carriage;

storage means for storing white reference data representing a white reference from said image reading
10　device in association with an ambient temperature in obtaining the white reference data; and

obtaining means for obtaining white reference data of an image reading device mounted on said carriage;

setting means for reading out white reference data
15　similar to the white reference data obtained by said obtaining means from said storage means and setting the readout white reference data in said image reading device mounted on said carriage.

46.　The apparatus according to claim 45, wherein said
20　carriage on which a print head unit for forming an image on a printing medium is detachabley mounted.

47.　The apparatus according to claim 45, wherein said setting means determines the similar white reference data on the basis of variance of the obtained white
25　reference data.

48.　The apparatus according to claim 45, wherein said

setting means stores obtained white reference data when the similar white reference data is not stored in said storage means.

49. An image reading method for an image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said method comprising the steps of:

obtaining identification information representing an image reading device mounted on said carriage;

reading out white reference data corresponding to the identification information obtained in the obtaining step from storage means which stores white reference data representing a white reference from said image reading device in association with the identification information of the image reading device; and

setting the readout white reference data in said image reading device mounted on said carriage.

50. An image reading method for an image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said method comprising the steps of:

detecting an ambient temperature near said carriage;

obtaining white reference data of an image reading device mounted on said carriage;

reading out white reference data similar to the

similar white reference data information obtained in the
obtaining step from storage means which stores white
reference data representing a white reference from said
image reading device in association with an ambient

5   temperature in obtaining the white reference data; and
       setting the readout white reference data in said
image reading device mounted on said carriage.

51.   A computer program product comprising a computer
readable medium having computer program code, for

10   reading an image of original by using an image
processing apparatus having a carriage on which an image
reading device for reading an image of original is
detachably mounted, said product comprising:
       obtaining process procedure codes for obtaining

15   white reference data of an image reading device mounted
on said carriage;
       reading process procedure codes for reading out
white reference data similar to the similar white
reference data information obtained in the obtaining

20   process from storage means which stores white reference
data representing a white reference from said image
reading device in association with identification
information of the image reading device; and
       setting process procedure codes for setting the

25   readout white reference data in said image reading
device mounted on said carriage.

52.   A computer program product comprising a computer readable medium having computer program code, for reading an image of original by using an image processing apparatus having a carriage on which an image

5   reading device for reading an image of original is detachably mounted, said product comprising:

detecting process procedure codes for detecting an ambient temperature near said carriage;

obtaining process procedure codes for obtaining

10   white reference data of an image reading device mounted on said carriage;

reading process procedure codes for reading out white reference data similar to the similar white reference data information obtained in the obtaining

15   process from storage means which stores white reference data representing a white reference from said image reading device in association with an ambient temperature in obtaining the white reference data; and

setting process procedure codes for setting the

20   readout white reference data in said image reading device mounted on said carriage.

53.   An image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said apparatus

25   comprising:

detection means for detecting an ambient

temperature near said carriage;

storage means for storing white reference data
representing a white reference from said image reading
device on the basis of a plurality of image reading
5   conditions, in association with each image reading
condition and an ambient temperature in obtaining the
white reference data; and

setting means for reading out white reference data
associated with an image reading condition set by a user
10   from said storage means and setting the readout white
reference data in said image reading device mounted on
said carriage.

54.   The apparatus according to claim 53, wherein said
carriage on which a print head unit for forming an image
15   on a printing medium is detachably mounted.

55.   The apparatus according to claim 53, wherein the
image reading conditions include an image reading mode
representing an attribute of image data obtained by said
image reading device, and said setting means sets in
20   said image reading device white reference data having a
characteristic corresponding to the image reading mode.

56.   The apparatus according to claim 55, wherein the
attribute of the image data includes at least one of a
color/monochrome, a resolution, and a bit depth.

25   57.   The apparatus according to claim 55, wherein the
characteristic corresponding to the data reading mode

includes a charge accumulation time of a charge-coupled device.

58.   An image reading method for an image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said method comprising the steps of:

detecting an ambient temperature near said carriage;

reading out white reference data associated with an image reading condition set by a user from storage means which stores white reference data representing a white reference from said image reading device on the basis of a plurality of image reading conditions, in association with each image reading condition and an ambient temperature in obtaining the white reference data;

setting the readout white reference data in said image reading device mounted on said carriage.

59.   A computer program product comprising a computer readable medium having computer program code, for reading an image of original by using an image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said product comprising:

detecting process procedure codes for detecting an ambient temperature near said carriage;

reading process procedure codes for reading out

white reference data associated with an image reading
condition set by a user from storage means which stores
white reference data representing a white reference from
said image reading device on the basis of a plurality of

5   image reading conditions, in association with each image
reading condition and an ambient temperature in
obtaining the white reference data;

setting process procedure codes for setting the
readout white reference data in said image reading

10 device mounted on said carriage.

60.   An image processing apparatus having a carriage on
which an image reading device for reading an image of
original is detachably mounted, said apparatus
comprising:

15   obtaining means for obtaining identification
information representing an image reading device mounted
on said carriage;

storage means for storing white reference data
representing a white reference from said image reading

20 device in association with the identification
information of the image reading device;

determination means for determining whether white
reference data corresponding to the identification
information from said obtaining means is stored in said

25 storage means;

updating means for updating the white reference

data stored in said storage means to new white reference

data obtained from said image reading device mounted on

said carriage when the determination result of said

determination means determines that the white reference

5   data corresponding to the identification information is

not stored in said storage means; and

setting means for setting the white reference data

corresponding to the identification information from

said obtaining means in said image reading device

10   mounted on said carriage.

61. The apparatus according to claim 60, wherein said

carriage on which a print head unit for forming an image

on a printing medium is detachably mounted.

62. The apparatus according to claim 60, wherein the

15   identification information is input by a user.

63. The apparatus according to claim 60, wherein the

identification information is stored in said image

reading device.

64. The apparatus according to claim 60, further

20   comprising detection means for detecting an ambient

temperature near said carriage,

wherein said storage means further stores the

ambient temperature in obtaining the white reference

data.

25   65. An image processing apparatus having a carriage on

which an image reading device for reading an image of

original is detachably mounted, said apparatus comprising:

storage means for storing white reference data representing a white reference from said image reading

5 device; and

obtaining means for obtaining white reference data of an image reading device mounted on said carriage;

determination means for determining whether white reference data similar to the white reference data from

10 said obtaining means is stored in said storage means;

updating means for updating the white reference data stored in said storage means to new white reference data obtained from said image reading device mounted on said carriage when the determination result of said

15 determination means determines that the similar white reference data is not stored in said storage means; and

setting means for reading out the white reference data similar to the white reference data from said obtaining mean and setting the readout white reference

20 data in said image reading device mounted on said carriage.

66. The apparatus according to claim 65, wherein said carriage on which a print head unit for forming an image on a printing medium is detachably mounted.

25 67. The apparatus according to claim 65, wherein said determination means determines the similar white

reference data on the basis of variance of the obtained

white reference data.

68. The apparatus according to claim 65, further .

comprising detection means for detecting an ambient

5 temperature near said carriage,

wherein said storage means further stores the

ambient temperature in obtaining the white reference

data.

69. An image reading method for an image processing

10 apparatus having a carriage on which an image reading

device for reading an image of original is detachably

mounted, said method comprising the steps of:

obtaining identification information representing

an image reading device mounted on said carriage;

15 determining whether white reference data

corresponding to the obtained identification information

in storage means which stores white reference data

representing a white reference from said image reading

device in association with the identification

20 information of the image reading device;

updating the white reference data stored in said

storage means to new white reference data obtained from

said image reading device mounted on said carriage when

the determination result represents that the white

25 reference data corresponding to the identification

information is not stored in said storage means; and

setting the white reference data corresponding to the obtained identification information in said image reading device mounted on said carriage.

70. An image reading method for an image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said method comprising the steps of:

obtaining identification information representing an image reading device mounted on said carriage;

determining whether white reference data similar to the obtained white reference data in storage means which stores white reference data representing a white reference from said image reading device;

updating the white reference data stored in said storage means to new white reference data obtained from said image reading device mounted on said carriage when the determination result represents that the similar white reference data is not stored in said storage means; and

reading out the white reference data similar to the obtained white reference data from said storage means and setting the readout white reference data in said image reading device mounted on said carriage.

71. A computer program product comprising a computer readable medium having computer program code, for reading an image of original by using an image

processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said product comprising:

obtaining process procedure codes for obtaining

5   identification information representing an image reading device mounted on said carriage;

determining process procedure codes for determining whether white reference data corresponding to the obtained identification information in storage means

10   which stores white reference data representing a white reference from said image reading device in association with the identification information of the image reading device;

updating process procedure codes for updating the

15   white reference data stored in said storage means to new white reference data obtained from said image reading device mounted on said carriage when the determination result represents that the white reference data corresponding to the identification information is not

20   stored in said storage means; and

setting process procedure codes for setting the white reference data corresponding to the obtained identification information in said image reading device mounted on said carriage.

25   72.   A computer program product comprising a computer readable medium having computer program code, for

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reading an image of original by using an image processing apparatus having a carriage on which an image reading device for reading an image of original is detachably mounted, said product comprising:

5   obtaining process procedure codes for obtaining identification information representing an image reading device mounted on said carriage;

determining process procedure codes for determining whether white reference data similar to the obtained

10   white reference data in storage means which stores white reference data representing a white reference from said image reading device;

updating process procedure codes for updating the white reference data stored in said storage means to new

15   white reference data obtained from said image reading device mounted on said carriage when the determination result represents that the similar white reference data is not stored in said storage means; and

setting process procedure codes for reading out the

20   white reference data similar to the obtained white reference data from said storage means and setting the readout white reference data in said image reading device mounted on said carriage.